

SYSTEMS & STRATEGIES FOR THE '90s—New Allies: IS and Service Suppliers

DIGITAL'S FIGHT STRATEGIES

**DEC Dukes it Out on the High End,
But Ducks the Competition on the Desktop**

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How Rockwell Launched Its EIS
EDI Aims High for Global Growth
Support for a Complex Network

1993 Holds Promise but Few Guarantees

INSIDE: Esther Dyson on Growth



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A closer look into TWA's Get Away Vacations reservation system brought VAX-based technology to IBM's Token Ring network.

Duking It Out on the High End

BY CHRIS SIVULA Digital's thrust into transaction-intensive markets like retail merchandising, banking and insurance is just getting off the ground. But to fly, the company must address a variety of hardware, software and marketing needs.

Ducking the Competition on the Desktop

BY CHRIS SIVULA Digital's strategy in the PC arena has been to become the integrator of other companies' systems. Is this a smart move or a critical weakness for the company?



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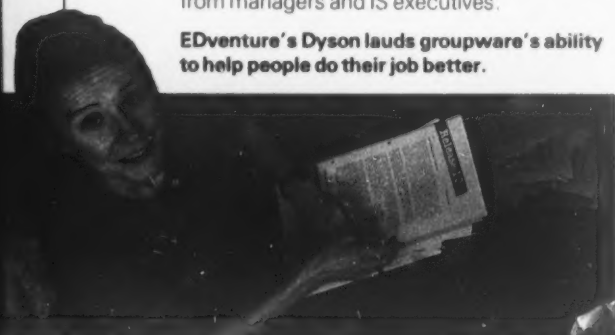
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BY DAVID A. ARMSTRONG A changing business climate didn't stop this division of Rockwell from diving into executive information systems. Part I of this two-part series by a member of the implementation team explores the system's early implementation.

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Servicing the IS Enterprise

So many workers have the ability to create, alter and use information with the touch of a keyboard as to render the best IS plans useless. So many executives and administrators have such a need for real-time information to operate their enterprises efficiently as to drive the staff mad. So few enterprises have the luxury of ignoring the IS pressure because many rely on the distributed networks of systems for the very revenues they generate. One only has to look back to the damage caused to so many U.S. enterprises when the nation's major long-distance carrier lost network control for several hours.

Choosing partners to help manage such enterprises, therefore, carries much more weight today than it did when stand-alone systems were the norm. That's why DATAMATION investigates two kinds of partners—a systems company and a field of IS service providers—thoroughly in this issue. In our cover story, "Digital's Fight Strategy," we examine whether the world's No. 2 computer maker, Digital Equipment Corp., can indeed serve the enterprisewide IS needs of major user organizations. In our special report, "New Allies: IS and Service Suppliers," we study the motives of users choosing to outsource a greater amount of their IS functions and those that are increasingly tapping information services databases for business-critical information.

Neither pursuit is gilded. In looking at Digital, Boston bureau manager Chris Sivula finds the company's strengths and its weaknesses. His conversations with customers, competitors and critics of the company disclose progress at the high end of Digital's product line but also reveal serious doubts about the company's low-end strategy. The company, Sivula concludes, must improve its hardware, software and desktop strategy. His report on Digital, our third major profile of the company in three years, should help you decide whether it's making the sort of improvements needed to serve your enterprise.

Finding Efficiency on the Outside

In tackling the entire information services industry, John McMullen weighs the pluses and minuses of relying on outside IS help. As part of our Systems & Strategies for the '90s series, associate editor McMullen looks at why users are increasingly turning to systems integrators and on-line database companies to help run their enterprises. Efficiency, he finds, is the chief objective of companies choosing to outsource programming and other critical IS tasks. "Bottom-line senior executives... are driving the outside services trend," says one executive.

McMullen's personal and telephone interviews with users and service suppliers took him from Jack-in-the Box restaurants in San Diego to a corporate boardroom in New York. The latter belongs to Dun & Bradstreet Corp. chief executive officer Robert Weissman, whose conversation with McMullen about the direction of the information services industry is as revealing as any you'll see. The role of D&B, DATAMATION's former owner, and other IS service providers in keeping your enterprise competitive cannot be underestimated.



McMULLEN: Looks at efficiency



SIVULA: Digging at Digital.

Photographs by David Bradley

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Tim Mead

Tim Mead, Editor-in-Chief



Duking It Out on The High End

Digital's thrust into transaction-intensive markets like retail merchandising, banking and insurance is just getting off the ground. But to fly, the company must address a variety of hardware, software and marketing needs.

BY CHRIS SIVULA

Craig Pavilus, the president of TWA Getaway Vacations Inc., was looking for a new reservation system. With an all-IBM shop, Pavilus wasn't thinking about considering Digital Equipment Corp. as a supplier. But one day his thinking changed.

"What started the whole thing for me was this Digital salesperson," recalls Pavilus. "His name is Carey Stronich. He sat outside in the reception area on our executive floor for six hours and wouldn't leave. He wanted to tell me about the system. He was the person that really cracked it for me."

"He tried to find out what the business need was, why did I want it [the reservation system] and what did I want it to do. When I described it to him, he disappeared. When he came back, he said, 'Here are some companies that can accomplish what you want done,' strictly from a software and applications side."

Mt. Kisco, N.Y.-based Getaway Vacations ended up with Autofile Inc.'s tour reservation package on a VAX 8500. The VAX-based system, connected via Digital's Ethernet technology, is linked to the corporate IBM system's Token Ring network. There was some grumbling at Getaway's IS department regarding the VAX system's ability to access data from the corporation's IBM mainframe, but, according to Pavilus, the problems were part of a normal shake-down period.

Getaway changed the way it sells tours last year. The company had been offering inflexible packaged tours, but now sells custom-tailoring arrangements for hotel, travel and other vacation services. The business just couldn't wait for a system that could handle the new complexities, according to Pavilus. "Since October, our business has been up 40% each month in terms of bookings," he says.

Digital likes to point to the TWA Getaway account as an example of the way it's finding opportunities in new markets. But for Digital to enjoy anywhere near the growth rates it has achieved over the past few years, it will have to rack up a lot more wins like Getaway.

In the 10 years between 1979 and 1989, Digital went from \$1.8 billion in annual revenues to \$12.7 billion, a hefty compound annual growth rate of almost 22%. But that rate slowed last year, dropping to a mere 9% increase and actually declining 2% at the end of the second quarter of fiscal year 1990. Profits last



TWA GETAWAY'S PAVILUS: The Digital system enabled Getaway to offer flexible vacation service packages, resulting in a big jump in bookings.

One problem holding back potential customers is that Digital isn't offering a consistent migration path.

year declined for the first time since 1983, with net income for the year at just over \$1 billion, compared with \$1.3 billion for the previous year. At the end of the second quarter of FY90, profits were down 44% from the same period of the previous year.

To grow, Digital must find new markets. To do so, it is trying to accelerate its evolution from a midrange supplier of boxes for departments and factories to a broad-based provider of integrated systems to commercial markets—in particular, largely transaction-heavy markets like travel, retail merchandising, banking and insurance.

Discussions with users, consultants, analysts and Digital officials reveal that to succeed in reaching these new commercial markets, Digital needs to make improvements in hardware, in software and in its desktop strategy. The company must also develop new skills in the areas of marketing sales, service and support.

If all goes according to plan, Digital will take steps this week to address those needs on the product side of the house. Expected improvements include the announcement of fault-tolerant capabilities for the VAX line of computers, two-phase commit software (necessary for distributed databases) for Digital's proprietary operating system VMS and new forms-processing features that can bring Digital closer to its goal of fully integrating its two transaction-processing monitors, ACMS and DECintact.

Digital is hoping the announcement will go a long way toward silencing critics who say the Maynard, Mass., computer maker doesn't have either the database technology or the on-line transaction-processing capabilities necessary to compete for commercial markets against the likes of Tandem Computers Inc. and IBM.

"Almost all the criticisms that are being leveled—that we don't have this and that—well, now we've got it all," says Bob Glorioso, vice president of the Information Systems Business Segment, Digital's new name for its high-performance systems group.

"If you want a fully distributed, high-performance, high-availability, commercial transaction-processing application and you wanted it to play in nine to 12 months, which is typically what it takes for a large application, then we can deliver it," Glorioso says.

Making the Move Into New Markets

It has been almost three years since Robert C. Hughes, vice president for service industries marketing, sold Digital on the idea of targeting vertical markets like the travel industry as a way to reach beyond its traditional technical, engineering and factory automation arenas. One of his first steps to further the strategy was to bring in Peter Robohm, then-manager of IBM's information systems group.

In April 1987, Robohm was named director, general service industry. He was given responsibility for

nurturing the wholesale, retail and freight distribution market, the travel service industry and the utilities market—which Robohm calls "greenhouse" markets, those that Digital has not much penetrated. Digital estimates that in the United States alone, those industries spend \$30 billion on data processing each year.



DIGITAL'S GLORIOSO: Orders for the 9000 mainframe have spanned the business world, including the auto industry, utilities, health care and banking.

The concept, explains Robohm, is to cultivate new markets into saplings, pass them on to other marketing groups in Digital and then take on new markets to start the process over again.

Digital says it's too soon to move any of these new markets out of the greenhouse, but Robohm's group is apparently making some headway. Although it considers exact dollar figures proprietary, Digital claims to have increased revenues by 20% to 40% in 1989 in these new markets, enough success to warrant the addition of some established markets to

Photograph by David Bradley

Digital's Profile

After years of over 20% growth, Digital Equipment Corp. slowed down somewhat in FY89; the \$12.7 billion in total revenues represents only a 9% gain from FY88.

- Product Sales: \$8.2 billion
- Service and Other Revenues: \$4.5 billion
- Cash Assets: \$1.6 billion
- Research and Engineering Expenses: \$1.5 billion
- Number of Employees: 125,800
- Workstations Sold Last Year: 50,000
- Total VAXs Sold: 300,000
- Total VMS Users: 8 million

Robohm's group—health care, education, and state and local government.

Robohm went out and hired new expertise, mostly former IS directors from the industries his group is targeting. His marketing staff cultivated independent software vendors to port applications to VAX machines; outside consultants were brought in to train the staff on the nuances of the specific industries.

"Our focus was to see if we could understand what the markets were, to understand what the problems were that kept the senior officers of those companies awake at night and procure, one way or another, those applications," Robohm says.

With a few victories like Getaway Vacations under his belt, Robohm says Digital's upper management started looking at his organization seriously.

Robohm's efforts haven't stopped criticism from outside the company, however. "When they get into these very sophisticated markets like OLTP, they'll need to have very competent salesmen," says James Johnson of the Standish Group International, a Hyannis, Mass.-based consulting firm.

Johnson is among those who view the departure last fall of Jack Shields, the executive who built Digital's marketing and sales organization, as a serious blow to the company's plans to increase its share of commercial markets. Shields joined Prime Computer Inc. as president and chief operating officer in January. At the end of a one-year transition period, Shields becomes CEO of Prime.

At any rate, Digital has acknowledged that there is room for improvement in its sales and marketing efforts. The company took several steps to strengthen these areas in the past year, including sending some 7,500 salespeople to summer school.

Digital also reorganized its marketing staff late last year, putting a single person in charge of each major account. As a result, major users no longer have to work their way through Digital's bureaucracy; instead, a user calls the assigned account executive who acts as a liaison to the rest of the company.

Such efforts haven't satisfied all critics, however. "The big problem for DEC is to become a market-driven company," Johnson says. "The absence of Jack Shields is going to have a major impact. He was one of the few souls at Digital to pop his head out of the engineering cocoon and see what the market wants."

"Until a few years ago, I think that argument against them was valid," says Dennis Healy, vice president of MIS for Paramus, N.J.-based Toys "R" Us Inc. His company uses about 1,000 MicroVAX IIs as point-of-sale controllers in its 400 toy stores.

"They never even came out and sold you anything. It was like going to Radio Shack—you had to know what you wanted, and you called them and they might answer the phone. You would order exactly what you wanted, and they would ship it," Healy says.

"In the past few years, though, they have made a concerted effort to become more of a traditional—like IBM or Unisys—service and software kind of company; a come-out-and-talk-to-you type company," Healy says. "They have done that very well."

For example, says Healy, Toys "R" Us does about half of its annual business in the month between Thanksgiving and Christmas. During that time, Digital keeps a couple of its people stationed at the Toys "R" Us to help with any technical problems that crop up.

Of course, Toys "R" Us is a major account. It's 15 years old and generates in the neighborhood of \$35 million in revenues for Digital each year. Naturally, it gets a lot of attention. But, overall, support for large commercial accounts is still a struggle for Digital, says Glorioso.

To the Database Victor

The world, according to Digital Equipment Corp., is moving away from the centralized mainframe toward a distributed model of computing. That means the time is ripe for Digital to start providing large, commercial transaction-heavy systems, says virtually everyone at the company, from founder and president Kenneth H. Olsen on down.

But according to many observers, whether or not Digital realizes its ambition depends on the success of Rdb, its relational database. Most transaction-processing applications draw on large databases and, last year, Digital began bundling a runtime license for Rdb with VMS, its proprietary operating system.

That move is an indication of how important it is to Digital that users accept Rdb, according to Dennis Vohs, chairman of Ross Systems Inc., a Palo Alto software house specializing in financial applications for VAX systems.

Digital is pushing Rdb because it can't hope to develop a truly distributed database system unless it controls its customers' existing databases, Vohs says. The massive development effort needed to provide a smooth migration to a fully distributed database isn't possible using third-party relational databases.

Enhancements last year, particularly in the ability of Rdb to utilize multiple disks, have impressed Roy Shulte, an analyst at the market research house Gartner Group Inc. "At this time, I would still characterize Rdb as lagging the leading third-party databases overall, but I would guess that it's only a year behind the other databases now, as opposed to being two or three years behind. DEC has really closed the gap considerably in the last year," he says.

This week, as part of Digital's effort to make Rdb suited for distributed computing applications, Digital is announcing two-phase commit software, which allows a single application to use data residing on multiple machines as if they were one computer. Digital is hoping that two-phase commit will bring Rdb closer to the sort of acceptance it's seeking in the commercial transaction-processing marketplace.

The technology is essential to building a fully distributed database, because two-phase commit is necessary for full recovery if one machine in the network fails.

But it's not all the technology that's necessary. "I don't think that anybody who isn't lying can claim that they have solved the recovery problem in a distributed database environment," says Tim W. Tyler, vice president of sales and marketing for Smart-Star Corp. The Goleta, Calif.-based software vendor sells a fourth-generation language product for VAX systems. "Just having a two-phase commit is not enough," Tyler says.

Since no one can deliver a fully distributed database today, Digital is on par with other vendors, Tyler says. "I would be



"We have a new set of applications to support," Glorioso says. "We've got to build up our support capabilities, particularly in large system installations, development and maintenance."

Still, Digital is making strides, Glorioso says. The company began training staff to support high-performance systems about four years ago. He estimates that about 1,000 Digital employees are now skilled in transaction-processing and database technologies and another 200 to 300 are what he categorizes as "top gun" experts.

Digital is also taking on partners from the consult-

Digital's made a concerted effort to become a come-out-and-talk-to-you type company.

ant community to help provide the sort of services that the commercial market requires. Alan Ross is national director of the DEC System Integration Group at Price Waterhouse in New York City, one of those consulting firms.

In his role at Price Waterhouse, Ross helps companies implement Digital systems. And he's raising questions about Digital's attempt to provide large-scale, high-performance systems.

"I focus primarily on the commercial side. In that area, there is no question that OLTP appears to be the biggest issue," he adds. "What's my high-end costs and what's my low-end costs? That's the first thing a corporation asks. When you get to 40 transactions per second, Digital is no longer a bargain because it takes too many VAXs to get there," Ross says. "A lot of companies, even with distributed computing schemes, are going to be bumping into 50 transactions per second. Even with a distributed computing style, there's always going to be a division that still has those high transaction rates." The VAX 9000 may bring the high-end costs down, but "a lot of our clients still believe that a big central IBM mainframe best fits their needs," he says.

Goes the OLTP Market

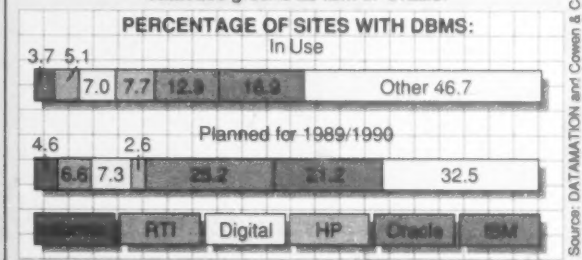
able to argue, I think quite strongly, that the last release of Rdb saw it come of age, and that the next release looks like it is going to have the facilities that will make it functionally equivalent—if not ahead—of most of the competitors."

Tyler is skeptical of claims that any relational database has yet captured much of the market for large commercial databases. "Let's keep some perspective here," Tyler says. "In the commercial world, the big databases in the insurance and banking industries are still predominately IMS [IBM's hierarchical DBMS, Information Management System], which comes from the early '60s," Tyler says.

According to Shulte: "Part of the solution is the VAX 9000,

A Long Way From Victory

Digital is not gaining nearly as much database ground as IBM or Oracle.



another part of the solution is to keep on improving Rdb, and part of the solution is to keep improving their OLTP software."

But, Shulte adds, arriving late to the party is a much bigger problem than any technical issues. "There is the inertia factor. If I'm an insurance company, and I have 5 million or 10 million lines of application code written to run on IBM mainframes—and that would not be at all unusual—I am not going to buy equipment from another manufacturer quickly," Shulte says. "I'm going to go piecemeal and buy one computer for one application now and maybe in a couple of years, if that works out, I'll buy another one for another application. In the meantime, I'm going to keep buying a lot more equipment from IBM than I am from Digital."

That means for some time to come, Digital will remain primarily a midrange vendor.

"DEC has grown into many places," says Gartner Group Analyst Steve Wendler. "But today, if you ask MIS to identify their enterprise system vendor, the answer is going to be IBM."

Too Many Monitors Spoil the Soup

Joseph Payne, a securities analyst for Alex Brown & Sons in Baltimore, is one of the harsher critics.

Payne feels that one problem holding back potential customers is that Digital isn't offering a consistent migration path for its transaction-processing technology. Rather, the company is offering two transaction monitors: the Application Control and Management System (ACMS) and DECintact. ACMS can schedule and control transactions into Digital's relational database Rdb; DECintact only works with DECdbms, DEC's flat file system.

"I've found that customers don't want to be given two different paths, DECintact versus ACMS," Payne says. "They don't want to be told that DEC's going to merge those capabilities down the road and have one monitor—they want one monitor [now]. They want to be told what the architecture direction is, and in that sense Digital is not really clearing up the confusion in their own marketplace about what path they are taking."

Glorioso says Digital is ready to take some of the blame for the confusion surrounding its monitors. There aren't two directions, he says, "But people haven't heard the message, and that's probably partly our fault," he says.

"The thing that two monitors brings to the marketplace is really simple. ACMS provides a fourth-generation-like style of programming, which many customers like, and DECintact brings a COBOL CICS-like style [IBM's Customer Information and Control System] of programming, and there happens to be a bunch of people who know how to program in that style," Glorioso explains.

Eventually, Digital will have one forms-processing technology, one kernel in the operating system for transaction processing and two application-programming interfaces, giving both ACMS and DECintact users a migration path. Included in this

COVER STORY

OLTP



week's announcement, in fact, was notice that the forms-processing software in both monitors would be partially merged.

All that's a game of catch-up, Payne counters. "They're talking about at some point eliminating the need for a separate monitor altogether," he says. "DEC's talking about a new, refined transaction focus in VMS, or maybe a VMS/UNIX-merged operating system for the 1990s. But they're talking about five-plus years. That's a long time."

If Digital may be trying to catch up, as Payne asserts, Tandem is trying to increase its lead in the transaction-processing market. About the same time that Digital introduced the 9000, Tandem was introducing the Cyclone, its own line of mainframes.

Digital's announcement of the 9000 mainframe in the fall has already muted a lot of criticism. The 9000 holds the potential to provide a high rate of transactions per second at a cost that is competitive with other mainframes in the new transaction-heavy markets Digital has targeted.

The new mainframe was the focus of the most recent Digital conference sponsored in December by the Stamford, Conn., research house Gartner Group Inc. "The bottom line of the whole thing was that DEC is doing a whole lot better in the mainframe arena than perhaps anyone had expected," says Cliff Conneighton, program director for office information systems at Gartner.

"Our IBM large systems analysts view the VAX 9000 as a very good, well-balanced

machine, completely of the mainframe class, with mainframe quality I/O and with none of the problems in the hardware which some people were anticipating DEC tripping on. None of those problems have surfaced. It's a good, very well-balanced, credible mainframe machine," he says.

"And their plans for the mainframe class operating environment and system management and transaction processing and database appear to be moving in the right direction. While they are not there yet, they know where they need to be," Conneighton adds.

The Question of User Acceptance

Despite the attention the 9000 has attracted, Digital's success in penetrating its new target markets will depend more on users' acceptance of distributed computing for applications that have traditionally run on central mainframes.

Raleigh Federal Savings Bank, moving a main-

DEC isn't there yet. They have neither the raw power, nor the message-based operating system capability.

frame application to midrange machines, is perhaps a more typical example of Digital's new class of users. A service bureau has been providing the North Carolina bank's information system, using a Unisys Corp. A-17 mainframe to handle Raleigh Federal's accounts.

The arrangement was fine while the bank was a typical savings and loan, says John Paschal, information services manager. "Since deregulation has come on the scene, we are moving more toward operating in the traditional banking arena," Paschal says. "The nature of our business has changed quite a bit. We offer many services now that every other financial institution offers, and we are probably more branch oriented than we used to be."

"That's exactly the reason that we felt we had to change our information systems structure. In trying to fill a certain niche in the market, we felt we had to put the data and the data-processing capability out in the branches, where the decisions are made, to serve the customer," he adds. "Going to a more distributed-processing kind of environment, we looked at several pieces of hardware and just felt that DEC provided the easiest way to accomplish our business objective."

The bank plans to use Profile, an integrated banking software package from Sanchez Computer Associates Inc. of Malvern, Pa. Profile will run on a VAX 6310 at the corporate headquarters and on MicroVAX 3100s at each of 33 branches. Tellers will use a combination of terminals and PCs.

With 250 accounts, Sanchez is a leading banking software vendor for Digital platforms. A smaller bank, like Raleigh Federal, that is moving from a service bureau to an in-house system, is a typical customer, according to chief executive officer Michael Sanchez.

But Sanchez sees potential in the 9000 to attract larger customers. "Until recently, we really couldn't go to a bigger bank and tell them to throw everything out, because Digital didn't have a mainframe," Sanchez says. "Now it is just a matter of, jointly with Digital, finding a large bank that wants to invest in that technology. Over the next year, we should find that bank."

Once Digital can demonstrate a few successes and a commitment to the market, more accounts will follow, Sanchez says. Nailing down big commercial accounts depends on the availability of applications from a lot of third parties, however.

In many cases, efforts to attract third parties are working. For example, Ross Systems Inc. of Palo Alto, which sells financial software for VAX systems, uses Rdb as its underlying database. Dennis Vohs, the company's chairman, says he's convinced Rdb will become an industry standard.

If that belief should catch on, Digital just may have a shot at fooling the critics and becoming a real threat to IBM and Tandem in on-line markets. □

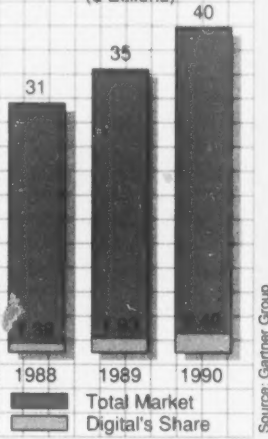
Next: Digital's reactive strategy for personal computers may either be its Achilles heel or one of the smartest moves it has ever made. Turn to page 36.

Room To Grow

Digital expects to strengthen its narrow OLTP foothold this year.

DIGITAL'S PERCENTAGE OF THE TOTAL OLTP MARKET

(\$ Billions)





Ducking the Competition on The Desktop

Digital's strategy in the PC arena has been to become the integrator of other companies' systems. Is this a smart move or a critical weakness for the company?

BY CHRIS SIVULA

At Coca Cola Foods in Houston, Digital Equipment Corp. had a shot at integrating the corporate office system when the company decided to install an office automation system two years ago. But it looks like those plans have gone the way of New Coke.

"We were at the beginnings of the whole issue of enterprise connectivity," recalls Cheryl Currid, director of applied information technology. "Our original thoughts on what the design would be were that we would run a lot of stand-alone personal-computing applications on PCs and some kind of shared system or office automation system either on an AS/400 or DEC." The final tier would be the corporation's IBM mainframe.

Coca Cola started implementing the office system by connecting local area networks using Novell Inc.'s NetWare operating system. "We never got around to buying the minicomputers," Currid says. Setting out to build a 386-based office system would have been a hard sell, but as it turned out "it just sort of happened," she explains. "We looked, and when the options were laid out it just made a lot of sense to continue building our own system with the LAN versions of some of the PC software."

According to Currid, the LAN-based system is easier to upgrade and maintain than similar systems based on minicomputers. "The biggest advantage is being able to dynamically reconfigure networks, people and software. It's just not difficult to do on a network. We've been able to add functionality to the system that we really didn't know we needed when we first came up."

The experience has been successful enough to prompt Coca Cola to consider other LAN-based systems, some of which could include manufacturing applications. Compaq Computer Corp.'s announce-

ment of its Systemspro network server sparked particular interest, Currid says. Compaq is claiming performance comparable to a minicomputer.

"DEC has sort of stayed away from it. I'm sure they know their business better than I do, but I'm almost surprised," Currid says. "If I were giving advice to DEC, I would probably advise them to test the waters. With all the connectivity they've got, they should be a player in this new world."

How Digital Plays the PC Game

Digital already sees itself as a player. "We have an aggressive strategy that consists of technology, products and services for this marketplace," says John T. Rose, group manager of the Personal Computing Systems Group in Littleton, Mass.

Digital jumped into the fray with its October 1986 announcement of PC integration products and services and has rolled out enhancements about every six months, Rose says. DECnet, Digital's networking architecture, supports MS-DOS, OS/2 and Macintosh systems at the desktop.

VMS, Digital's proprietary operating system, has been under continual development for 15 years. Several hundred million dollars have been pumped into the system. That gives Digital a distinct advantage over leading local area network suppliers like Banyan Systems Inc., 3Com Corp. and Novell, according to Rose.

"Our architecture utilizes any VAX from a MicroVAX 2000 right up to the latest VAX 9000 as a server for the PC. Our server software sits as a layered product across VMS and utilizes all of the aspects of VMS. So, you have security, all of the networking and all of the robustness of VMS," Rose says.

Digital thinks more users will shift to a client/server model of computing and that Digital's PC



COCA COLA'S CURRID: A LAN-based system is easier to upgrade and maintain than similar systems based on minicomputers.

strategy is well suited to taking advantage of that shift, Rose says. The major problem isn't technology, but making users and the various companies that resell Digital products aware of its PC integration products and services.

"We've been doing a lot of things in that area over the last 18 months," Rose says. He points to the company's beefed up ad campaigns and plans to educate resellers of Digital products.

But the fact that companies like Coca Cola aren't buying the message may reveal a soft underbelly at Digital. The company's strategy in the PC arena is to integrate existing desktop systems into corporate networks, but some feel this may not be enough.

Where Digital May Be Losing

At the Stamford, Conn.-based market research house Gartner Group Inc., Digital's failure to demonstrate a winning PC strategy is viewed as its major shortcoming. "If there is anything they need to address, anything that will kill them over the long term, it's the desktop," says analyst Steve Wendler.

"There are 35 million PCs out there. The vast majority are not DEC products or even connected to DEC

products. That's hurt short-term revenues, but the real problem is strategic—the failure to create a customer base among desktop users," Wendler says.

"They've got to change that, because those desktop users are going to grow up, and they won't grow up with any identification to DEC," he concludes. "There's a whole generation that DEC has been cut off from."

It's not exactly a new story. Digital's problems on the desktop date back to 1982, when it introduced its own line of personal computers and failed to gain a significant piece of the market. But as Digital attempts to become the computer company for the enterprise of the 1990s, there's evidence that this recurring issue could hurt that effort.

Cowen & Co., a Boston-based financial securities firm, has been polling DATAMATION readers on their minicomputer and microcomputer purchasing plans since 1973. The most recent survey, conducted last summer, revealed that 41.1% of the money that the 4,700 respondents planned to spend on new systems in the coming year would go to buy PCs. In contrast, only 36.4% of their dollars were expected to go for minicomputers. That translates

Photograph by Janice Rubin

COVER STORY

PCs

into an 11.3% increase in the dollar value of PC shipments over the previous year and a 10.5% decline in the dollar value of minicomputer shipments.

Perhaps more foreboding for Digital is the potential for PC applications to bypass minicomputers altogether, such as in the case at Coca Cola.

Where Digital Is Winning

Digital's Rose paints a different picture. Digital's PC strategy plays well with the company's plans to target new markets, he says. "Over the last 18 to 24 months, we have had tremendous success in penetrating accounts where Digital had relatively little business, particularly accounts that have tradition-

A system at TWA's Getaway Vacations Inc. in Mt. Kisco, N.Y., is a lot smaller, but depends on a similar integration of Apple, IBM and Digital equipment. The ability to use the desktop device of choice is one of the major advantages, according to president Craig Pavilus.

He has a Macintosh at his office and another at home. Coming from a marketing, rather than a computer background, Pavilus says Macintosh's famed ease of use is just the ticket.

The sales staff uses terminals to access the application, but management uses 15 Macintoshes to oversee the business. "I have on my Mac a . . . display, by product line numbers, of sales and revenue, and it's updated every 30 seconds. What the system really provides is a sales management tool," Pavilus says.

But some experts are wondering aloud whether simply connecting other manufacturers machines is the right desktop strategy. Even if companies like Coca Cola Foods, for example, had gone with Digital for its office automation system, a weak PC offering would likely still be causing fiscal problems for the computer maker, according to the Gartner Group. Analysts at Gartner evaluated All-In-1 Phase II, the latest version of Digital's integrated office automation package. The outcome wasn't favorable for Digital's bottom line.

Unlike previous versions, the new package supports multivendor desktop workstations, including Macs and OS/2 and MS-DOS machines. But, as more of the processing power moves out to those other vendors' desktop devices, so does the revenue, says Cliff Conneighton, Gartner's program director for of-



DIGITAL'S ROSE: Digital's PC strategy is well positioned to take advantage of the shift to the client/server model of computing.

ally been IBM strongholds." The two areas that are most obvious in that are banking and insurance, he adds.

And Digital can claim some recent wins. In January, Aetna Life Insurance Co. announced its selection of Digital as the systems integrator for the 72 offices in its Employee Benefits Division. Digital will implement and manage the project, which links 30 MicroVAX 3400s to some 1,000 Apple Computer Inc. Macintosh personal computers and to the corporation's IBM host systems.

A spokeswoman for Aetna won't reveal dollar figures, but says that, because of the service contract, Digital receives the lion's share of the total integration dollars.

fice information systems.

A 100-user configuration under the old version of All-In-1, using terminals on the desktop, cost \$709,000, all of it collected by Digital, Conneighton says. A 100-user configuration using All-In-1 Phase II, with third-party workstations on the desktop, costs \$621,000, and Digital gets only 24% of the revenues. If a user gets creative and takes advantage of some free services available for VMS, the cost of All-In-1 Phase II can drop to \$532,000, with just 11% going to Digital.

"If you compare [11% of a \$532,000 sale] to where they were before, they are down to 8.5% of their original \$709,000 sale. All the rest of that money—91.5%—is going to third-party PC makers



Digital could get its feet cut off and bleed at the ankles if it loses the All-In-1 marketplace.

and third-party application providers," Conneighton says. "DEC's biggest revenue/profitability risk in the 1990s is not adding enough of the value in areas that are becoming the dominant component of the system's price—applications software and the desktop hardware."

The New Players

New competition compounds such risks to Digital in the office automation arena, says Joseph Payne, vice president at investment banking firm Alex Brown & Sons Inc. in Baltimore. He suggests that, although Digital is attempting to move into new markets, there is a danger of losing ground in areas where the company has been traditionally strong.

For example, All-In-1 controlled as much as 40% of the office automation market in the late 1980s, Payne says, but that was before last year's release of IBM's OfficeVision product. "IBM is looking at the All-In-1 marketplace as a major battleground for 1990," he says.

IBM won the hearts and minds of users when it pumped enough money into Intel Corp. to keep development of the i486 32-bit chip afloat, Payne says. "And now they are buying the hearts and minds of the applications cogenitors with minority investments to write for the i486 standard.

"Digital stands to possibly lose major share against IBM," Payne adds. "That's the Achilles' heel. That's not an inappropriate pun because they could get their feet cut off and bleed at the ankles if they lose the All-In-1 marketplace."

Are PCs Toys?

One former Digital employee, requesting anonymity, suggests that founder and president Kenneth H. Olsen simply doesn't consider PCs real computers. "I really don't think he understands modern computing," the employee says. "I don't think he understands what people use computers for today, and that's why he's missed the PC. He really does still think they are toys."

And Olsen's own comments offer some evidence that he takes PC-based applications less than seriously. "One reason computers have not helped productivity is that they encourage people to make endless numbers of slides... devoid of meaning and content," Olsen told a recent gathering at a conference on client/server computing sponsored by the Cambridge, Mass., research firm Forrester Research Inc.

"The spreadsheet may go down as the worst thing to ever happen to U.S. industry, because its users lose sight of their own businesses," he added. Of course, Olsen might be right. According to Gartner Group's research, white-collar productivity in 1987 was exactly at the same level it was in 1967. And that was after huge investments in PCs and integrated office systems.

Digital is banking on a strategy that says the greatest value it can bring to the PC arena is connectivity, leaving other vendors to build the boxes. That policy could be smart business. As the cost of personal

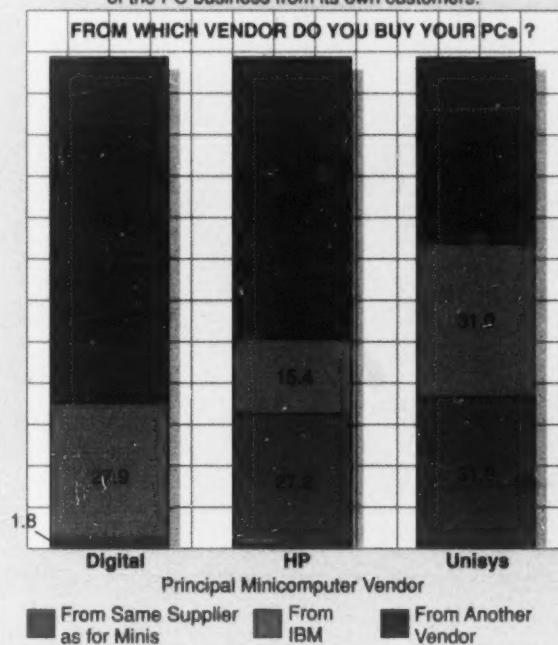
computers drops and competition heats up, profit margins per box will be small indeed. Digital may be better off staying out of what is essentially becoming a commodity market.

Digital's PC integration business doubled between 1988 and 1989, reaching \$400 million in revenues for fiscal year 1989, which ended last June. The figure is expected to double again in the current fiscal year. That success has translated into additional attention and resources from Digital's senior management directed at the Personal Computer Resource Group, Rose says.

Digital's minicomputer heritage may, however, still be distorting its outlook. Olsen has often said

Missing the PC Market

Digital hasn't been able to gain more than a toehold in the PC market, even in its own customer base. Rival IBM captures 57.2% of the PC business from its own customers.



that large classes of users—secretaries and factory workers, for example—will never want more than a terminal on the desktop. But Coca Cola's Currid disagrees and, if she's right, Digital's PC strategy is going to mean missed opportunities. the cl "In a LAN environment, you put the processing power on the desktop, and it's amazing what people will rise to in terms of their use, even secretaries," she says.

For example, secretaries using PCs are able to juggle the workload from more executives than they could with either a terminal or a single-tasking computer, Currid says. "It's those kinds of things that maybe aren't intuitively obvious to mini and mainframe people."



New Allies: IS and Service Suppliers

Outsourcing and on-line databases are being embraced by IS executives as a means of improving efficiency. But are there reasons beyond cost and scarce IS talent for relying on outside IS service suppliers? You bet!

BY JOHN McMULLEN

The 1990s promises to be an era of efficiency, if nothing else. All organizations, public or private, will strive to make decisions, create products and deliver services faster, cheaper and better. The pressure to achieve those objectives will be felt strongly by managers of information technology, whose systems will carry out the ends needed by corporations, agencies and institutions of all kinds.

Information systems executives are responding to such pressure in a variety of ways, as we've seen in previous reports in *Systems and Strategies*, a continuing series in *DATAMATION* this year. They are focusing more intently on applications. They are building electronic hierarchies to organize their

companies. They are distributing their computer power out to where it can be best applied via networked client/server systems. Perhaps the most innovative and profound way, however, is to make their own IS organizations more efficient by increasing their reliance on outside IS service providers—both for professional needs such as programming and for information needs such as databases.

Managing these IS resources, external as they may be, will become an important task for top IS professionals in this decade. To take advantage of such resources, chief information officers, network managers—virtually everybody in IS organizations—must:

- Understand when going outside helps. If IS managers are under pressure to reduce costs, or if they face critical IS talent shortages, they probably should be seeking help from service suppliers.
- Examine where IS employees are spending their time. If they are relying more on outside service suppliers, they probably should be spending fewer hours at internal staff meetings and more hours visiting and conferring with the professional and information services providers.
- Focus their internal IS resources on critical projects. IS employees can feel threatened when their departments decide to outsource. Managers can minimize bad feelings by maximizing employees' participation in projects criti-



AMS EXEC GROSS sees bottom-line conscious executives driving their IS peers to consider outsourcing as an option.

Photograph by Dennis Brack

When we had our own systems programming staff, they were always fighting with the users for resources.

cal to the way their organization will compute in the 1990s, such as local area networking implementation.

■ Measure, maintain and improve IS quality and responsiveness. If IS departments want to continue to serve the information needs of their customers—i.e., end users—they should ensure that the services rendered end users do not suffer when the services are shifted to outside suppliers. Issues such as interfaces, quality of data and support are critical.

The trend among medium and large user organizations to depend more on outside IS services is unmistakable and, to a degree, unavoidable.

Users worldwide are expected to more than double their already hefty spending on professional IS services by middecade from \$101 billion in 1989 to \$242 billion in 1994, according to Input Inc., a market research firm in Mountain View, Calif. The firm's definition of such services—which are increasingly coming under the umbrella term of "outsourcing"—covers processing services, network services, turnkey systems, systems integration and other functions.

The need for outside information services stands to grow from \$19.7 billion in 1988 to \$32.5 billion in 1993, estimates Veronis, Suhler & Associates Inc. The New York City investment banking firm categorizes information services into marketing, economic/financial, credit, payroll/human resource, product/price, legal/regulatory, scientific/technical and general business data.

What's causing such demand is hardly a secret. Affecting IS operations are the same forces shaping every other business decision in this last mile before the new millennium. Global competition, shareholder pressure and human skills shortages, among other forces, are leading the '90s corporation to seek out expertise of all types. If a commercial systems integrator can tie corporate systems together better than an in-house systems integration staff, so be it. Outsource! If a database vendor can collect more accurate marketing information on a corporation's products, so be it. Access!

The Ins of Outsourcing

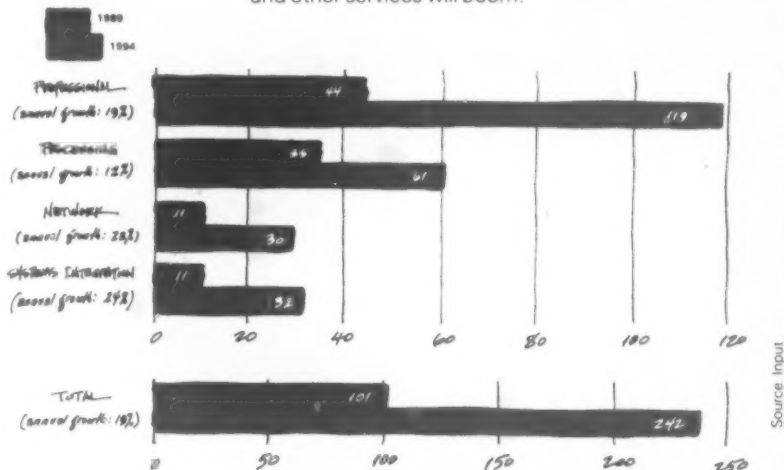
What really lies behind and beyond such calls for IS action? Here are the lessons of a few users that have chosen to rely more on outside professionals to do their computing, as well as the thoughts of some leading experts as to what's causing them to behave this way. Later on, you'll find out why users are building conduits of information into their organizations from outside reservoirs of marketing

and other vital data.

Outsourcing, a term that came into vogue in IS circles in the late 1980s, is general by definition but specific by application. It describes a variety of services, everything from outright facilities management to contract programming, from network management to systems integration. But it also must be applied on a case-by-case basis—that is, it's not for everybody.

The Outsourcing Services Explosion

As users outsource more of their IS operations, the demand for professional and other services will boom.



In fact, DATAMATION's own 1989/1990 IS budget survey, which will be detailed in our April 1, 1990 issue, reveals that the average IS executive this year is budgeting only 12.6% of resources for outside IS services.

There is mounting anecdotal evidence, however, showing that users in the '90s will be moving specific pieces of the IS function outside. Some see a chance to free up IS resources from central, headquarters-type functions to distributed line applications. Dial Corp., for example, six weeks ago announced its decision to outsource most of its mainframe processing to Andersen Consulting. The Phoenix-based company, a subsidiary of Greyhound Corp., gave Andersen the big iron tasks in order to concentrate its IS resources on building a distributed network of midrange systems to support its personal-care and household-goods operations.

David McKay expects to see a lot of companies take this approach in the 1990s. The director of resource operations at Lexington, Mass., consulting firm Nolan, Norton & Co. says, "The way technology will be used will be different in the future. Instead of functional organizations, companies will be more oriented around their business units."

Patrick Gross, vice chairman of American Management Systems Inc., confirms this trend among his systems integration customers. "Bottom-line senior executives who are more knowledgeable and

more involved in business objectives are driving the outside services trend," says Gross, whose Arlington, Va., company has grown to \$213 million as a result. "They are thinking, 'I will trade total control [of a specific project] for greater impact on my business.'"

The Programming Payoff

One user organization that's already seen the impact of outsourcing on its performance is Great American Bank SSB of San Diego. Six or seven years ago, the bank's programming staff was struggling to meet the demands of its end users. So it shifted responsibility for programming to an outside firm, which went out of its way to seek input from Great American's end users to establish programming priorities.

Great American replaced all of its in-

ternally developed software with commercially available banking packages from Systematics Inc. of Little Rock, Ark. The bank's contract with Systematics calls for the firm to install, customize and maintain those applications. As a result, Great American has been able to reduce its programming staff from 85 to 51. "We just could not afford to develop our own applications," explains Tom Lester, first vice president and manager of Great American's IS division in San Diego. "When we had our own systems programming staff, they were always fighting with the users for staff resources. Now those choices and decisions are made by the users themselves."

Another San Diego user organization, Foodmaker Inc., has pursued outsourcing not so much to redistribute resources as to reduce costs. Consequently it

An Information Provider's View

Few suppliers of IS services stand to benefit more from the growing corporate appetite for competitive information than Dun & Bradstreet Corp. The New York City-based information services company has grown to \$4.3 billion by feeding information to the corporate world.

Robert Weissman, president and chief operating officer of D&B, shares some of his thoughts about the future of the information services business with us.

Q: What's driving demand for information services?

A: The *Fortune* 500 companies are likely to be much more intensive [users of information services] in response to uncertainty in the rate of change they are experiencing. We're seeing rapid change being brought about in so many markets as a result of new technology infusion, breakdown of geopolitical barriers and globalization of markets. All those things tend to create instabilities, uncertainties and risks. And as human beings, we want to be able to manage that uncertainty and those risks. One of the prime devices we have is to better understand that environment, and that means information.

Q: How much are technologies such as compact disc read only memory (CD-ROM) and networking fueling the explosion in user requirements for more information?

A: It's a process between the technology and the customers, who are reacting to technology change at a greater rate than ever before. Ten or 15 years ago, the technology was totally alien to the main body of end users. The phenomenon of the personal computer has done more to change that perhaps than anything else. . . . He [the end user] is an order of magnitude or two more sophisticated about technology than he was. The end user is in a position to recognize much more clearly what technology ought to be able to do. His expectations are rising. He is likely to have a lot of computer power on his desk, and he has a greater degree of control.

There is more computer power on the desk of a *Fortune* 500 company than there is in the IS department of that company . . . by a lot. They [end users] are saying we want to be able to get the information response that we need flexibly, quickly and transparently. This is driving to the same sort of de-massification that's taking place in other businesses.



D&B'S WEISSMAN says users need more info.

Q: What will drive the integration of internal and external information—better applications or filtering mechanisms?

A: To a great degree, it is applications. There are still today technology barriers to be

broken down. [In collecting point-of-sale information, for example,] we are collecting it more and more intensively each day. The last time we checked, that [POS] database was at 4 terabytes and growing rapidly.

You can say that computing power comes fast and cheap and can do a lot more, but 10 years ago a big database was 50 million bytes. Now when you talk about a database, it might be 50 terabytes, so you still have a major challenge [in creating information from data]. You have software issues, and issues about efficiently deciding where in a network environment that data are going to reside and [where] the processing ought to be done. Even though we may have moved from a 300-baud world to T1 lines, when you start talking about the quantity of data being collected, communications issues have not disappeared.

Q: Given such huge amounts of information being collected and stored, the potential for information overload seems greater than ever. Do you agree?

A: Your term, filtering mechanisms, continues to be very important for that very reason. Perhaps the greatest danger I think the typical company has is that there's that human tendency to define information needs—information systems needs—in the context of the data that are easiest available. That's contrasted to data that are needed to make a better decision or come to a better understanding.

In IS, that's an ongoing tendency and one that can lead to disastrous results. They measure what is easily measurable, but guess what? What gets measured becomes very important.

If you're an IS director, the real challenge is to be an information engineer who understands the end user's information needs well enough to really get a grip on what is relevant to his needs in terms of hardware, software, communications and data and how that ought to be packaged or engineered.

Outsourcing, a term that came into vogue in the late 1980s, is general by definition but specific by application.

has pursued a slightly different IS outsourcing path: taking the processing route rather than the programming road. The fast-food chain operator is buying raw computing power from Litton Computer Services—a choice it made some five years ago. At the time, recalls Foodmaker IS vice president Terry Babbitt, the company was in the midst of a leveraged buyout, limiting what the company could spend on internal IS operations. Nevertheless, it also had grown so fast that it needed to develop its own data center.

Foodmaker opted to farm out its mainframe operations to Mountain View, Calif.-based Litton. "It required no capital investment and was cost effective," Babbitt says, revealing that IS costs are down 15% as a result. The deal also entailed little risk that Foodmaker would lose control over its IS destiny. To this day, it has complete freedom to manipulate its own data—even though they reside on Litton's machines.

The outsourcing deal has another big benefit. Foodmaker can spend its IS dollars elsewhere. For example, it's currently installing 386-based PCs in the back offices of each of its 600 company-owned Jack-in-the-Box restaurants. The PCs feed data to Foodmaker's own minicomputers, which in turn send information to Litton's mainframes.

Like Great American and Foodmaker, most user organizations that rely on IS outsourcing do not relinquish all of their IS operations to suppliers. To do so, say some executives, is a big risk—one that's difficult to justify taking up front. Not even Eastman Kodak Co., the most notable example of a corporation that's decided to outsource much of its IS operations, has handed over all of its IS tasks to its chief outsourcing suppliers, IBM and Digital Equipment Corp. IBM will run Kodak's data center operations, while IBM and Digital share management of its network. Kodak is going to focus its IS energies on building distributed applications within its business units.

The Right Approach to Outsourcing

But visible moves, like the film giant's, put increased pressure on other corporations to explore the option of outsourcing—if not everything, then at least pieces of their IS operations. "Primarily, financial pressures are forcing them [publicly held companies like Kodak] to focus on what they do well," says Edward Choate, a consultant for Arthur D. Little Inc. in Cambridge, Mass. "In light of that, companies are taking a look at each function of IS before deciding to outsource piecemeal."

For TRW Inc. the piece of the IS picture that's going to be left out will be mainframes. TRW has set its sights on moving away from host-based computing on mainframe systems to a client/server model that uses IBM PS/2s and Apple Macintoshes as workstations and Digital MicroVAXs as servers. "Obviously [our] well-trained technical people see the end of

their career ladder as we phase out mainframes," says Bill Nelson, director of technology management for TRW's Corporate Information Resources. During the phasing out of those systems, TRW will need outside sources of maintenance support if its mainframe technical talent flees or needs to work on other types of systems at TRW.

In TRW's new vision, end users will become much more self-sufficient. "Our thrust is to try to change the information technology such that the end user has control of his own destiny and is really proactive in the development of his [own] applications," Nelson explains. At some point, he adds, mainframe applications that cannot migrate to PCs are likely to be



FORD'S LINDER buys data from Japan, Europe and the U.S. He measures the data's value by how much end users use them.

outsourced to third parties. Currently, the Cleveland-based company's automotive and corporate divisions, under strict orders to hold down employee headcounts, are going outside for contract programming on special projects. About 10% of the IS work load in those divisions is now performed by outsiders.

Not all of those who are outsourcing are entirely enthusiastic. Right now, for example, Gillette Co. believes most IS functions are best kept inside the razor kingdom. "The real issue [for Gillette] comes down to whether we can do it better in house," says Ted Standish, director of information resources for Gillette's North Atlantic Shaving & Personal Care Group in Boston. That's where the company's main data-processing center is located. Nevertheless, Gillette does intend to make greater use of IS outsourcing services, notably contract programming and facilities management in the United States and Europe. Most of its outsourcing will occur from its smaller remote sites, where there may not be enough work to keep in-house staff occupied.

However, for the most part Gillette is comfortable handling those IS chores on its own. "We're where we want to be," Standish says, explaining that main-

Photograph by John Hilary

SPECIAL REPORT

SERVICES

tenance will always be an issue in deciding whether to go outside for things like contract programming.

"We have an application that's very important to our operation that was written several years ago," he says, by way of an example. "The software it was written with no longer exists, so we have to hunt up the last known guy familiar with the application when things go wrong." Standish adds that Gillette

now buys a lot of applications packages off the shelf instead of starting from scratch. "We develop applications from scratch only for things that are unique to our business or to our company."

Another user, Fleet/Norstar Financial Group Inc., a superregional bank headquartered in Providence, R.I., seems to be hesitantly testing the outsourcing waters. The banking group's use of outsiders is limited to things like processing credit card applications, although it may expand to trust processing.

"Obviously, we must be given assurances that we will have [some] control of level of service," says Michael Zucchini, Fleet/Norstar chief information officer. He doesn't expect outsourcing to be a new wave at Norstar because as he puts it, "We believe we

can do it as well as anyone else. Our data processors are good business people."

The one-is-step-at-a-time approach to IS outsourcing may, however, give way to an all out rush. "Systems management is the business of the 1990s," asserts John Oltman, a managing partner with Andersen Consulting's worldwide integration services. The firm's view of systems management extends beyond facilities management, a term that simply describes the maintenance of computer processing and networks, to include software renewal and enhancement.

"We think the best answer [may be] joint ventures for delivering IT solutions," Oltman says. User organizations and integrators such as Andersen Consulting are likely to be entering arrangements in which both share the risks and the rewards of codeveloping systems. The shared approach will most likely be pursued in cases where user organizations are radically changing their approaches to particular areas of business.

When Sharing Makes Sense

Shared development may be the most effective way to win favorable judgment, believes Barry Sullivan, director of corporate marketing for Electronic Data Systems Corp. of Dallas. "Large from-the-ground-up systems development exercises are going to be rarer and rarer," he predicts. Instead, he sees

users and integrators collaborating to build systems out of customizable components.

Sharing is very much part of the IS culture at Royal Bank of Canada. The Montreal-based bank, Canada's largest, is working with a software applications developer to create a program that would allow the bank's end users to extract information via PCs from any centrally located or remote database. The application itself belongs to the developer, which the bank says it can't identify yet for contractual reasons. Part of that contract calls for the developer to maintain the application for the bank; another part allows the developer to sell the program to other user organizations.

Royal Bank's return on the shared project is considerable. Beyond the cost savings realized by sharing development expenses, the bank requires far fewer IS staffers (if any) to maintain the program. "The long-term benefit is [that] over 70% of my staff is now freed up to develop new technology and new applications," says James Grant, executive vice president of systems and technology of Royal Bank.

Technology itself will play a key role in accelerating the trend toward outsourcing IS services. Advances in networking, for example, allow organizations to outsource more processing without disruption to end users. Furthermore, the specialized knowledge required to take advantage of technology will lead organizations to search for the best economic terms for obtaining such knowledge—a search that frequently leads them outside.

The danger, of course, is loss of control, but the reward, flexibility, may be worth it. "If the technology issues are really highly strategic to you, you have to be careful," cautions Nolan, Norton's McKay. "You could give up a level [degree] of flexibility by using an outside vendor. It's one of the big trade-offs."

The Competitive Value of Information

Although many IS organizations have had no direct experience with outsourcing professional aspects of their IS operations, few have escaped the need to look outside for information critical to their companies. More than 4,000 commercial databases already exist to provide such information—a number expected to grow during this decade as access to reliable information becomes an increasingly important competitive tool.

"We see a gradual trend to expanding the external supply of information relied on by corporate IS," says Arthur D. Little's Choate. "The information is being used for strategic and planning areas and not as it once was for operations and control." Two things that will enable IS executives to deliver such information, he adds, are better filtering applications and expert systems. The former will create manageable amounts of information; the latter will link together abstract relationships among data.

A challenge for IS executives, then, is to merge outside information with inside information to create a database of knowledge from which managers can draw to make decisions they otherwise could not make.



SCWHAB'S BARMANN sees demand to combine internal and external data.

External database information can be grouped into any of a half dozen or so overlapping categories. Those include analytical economic and financial information; business information (for credit risk models, financial analysis, strategic planning, mergers and acquisitions and cash flow management); legal and regulatory information; medical, scientific and technical resources; marketing information (analytical data for competitive analysis); and business industry news (such as the Dow Jones News/Retrieval service).

Hands down, marketing research constitutes the most popular and sought after data. Veronis, Suhler & Associates predicts that corporations will continue to spend twice as much for marketing information as they do for the next single biggest category, economic and financial data. The investment banking firm estimates that companies bought nearly \$7 billion worth of marketing data in 1988—representing 35% of total corporate outlays for information services that year. Spending for economic and financial data accounted for almost 18%, or \$3.5 billion, of the \$19.7 billion allocated to such services in 1988. The total market in 1993 is predicted to reach \$32.5 billion.

Fueling the sort of growth expected by Veronis, Suhler are structural changes taking place in user organizations. Kodak, which is striving to become as decentralized as possible, again provides an excellent example. "Historically, we looked inside for information in planning for the future," says Roy Holmes, associate director of corporate IS at Kodak. Holmes estimates that as much as 90% of such information used to come from inside the Rochester, N.Y., company's various divisions.

"As the business units get up to speed, they will find more and more need for information about products and competitors. The bulk of that will come from external sources," Holmes predicts. Within 10 years, he says, Kodak could be obtaining 90% of its information outside. For the moment, its use of external database information is limited mostly to Mead Data Central's Lexis (legal) and Nexis (news and business) services.

The Cost of Information

For other users, the cost of information is nearly as important as the quality and timeliness of it. "At what price can the [external] information be obtained is always an issue," says Mark Barmann, executive vice president and chief information officer of Charles Schwab & Co. Inc. of San Francisco. "The economics of obtaining the data are not always easy to see."

The extent of Schwab's use of external data may come into sharper focus as the firm implements its new distributed-computing plan for the '90s. Schwab plans to disperse real-time information over an enterprisewide network. The plan, dubbed Schwab's Architecture & Migration Strategy, will move the firm away from a single-node, classical mainframe hierarchy.

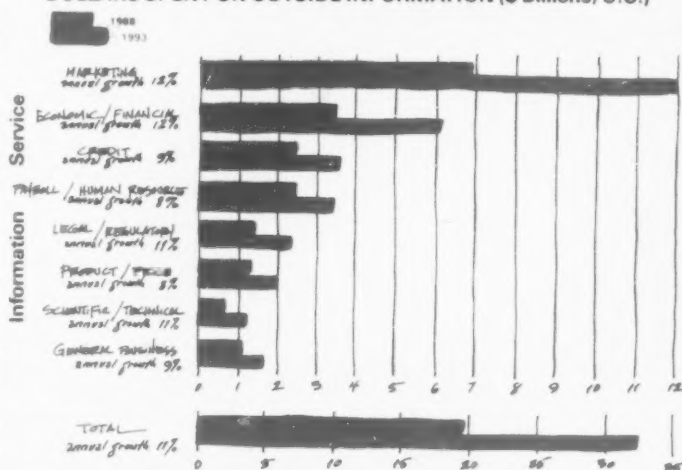
Like Kodak, Ford Motor Co. is another example of a nonfinancial corporation with a huge invest-

ment in and commitment to both external information services and internal data. Ford combines external data with its own information to offer an on-line information service. The service comprises 24 separate databases for some 4,000 of the company's end users. Most users today are Ford product engineers and product planners; fewer than 20% come from the manufacturing ranks. More factory end users

The Unsatiated Information Appetite

As competition grows more fierce in business, end users will demand more information from the outside world.

DOLLARS SPENT ON OUTSIDE INFORMATION (\$ Billions, U.S.)



Source: Veronis, Suhler & Associates

are expected to use the service, however, as Ford adds more manufacturing database information.

"We buy data from Europe, U.S. and Japan. For data we cannot buy, we do it ourselves, working with a vendor," says Rick Linder, who manages Ford's Corporate Technical Information System (CTIS).

Justifying the cost and quantifying the benefits of information is always tough, Linder says. "We don't sell data by the pound." Still, he says, "even though you cannot put a value on it, management recognizes the wisdom of using and storing information everyone can use. Justification comes in the form of the time users say CTIS saves them."

The databases contain gigabytes of information on the automotive industry, including news files, technical files, vehicle specifications. The bulk of the external data is acquired from the Society of Manufacturing Engineers (SME) and the Society of Automotive Engineers (SAE). Linder maintains, however, that one of the major benefits of CTIS, which went on line some four and one-half years ago, is to avoid overloading workers with information.

But, he cautions, "it's like walking into a big library. You have to know what you're after, organize your search strategy and then execute the search. Having the data on a mainframe requires the same thought process. Benefits include the ability to do a search and [having] a library that's as close as the keyboard on your desktop machine."

EDI Aims High for Global Growth

Suppliers and users of electronic data interchange (EDI) services have a vested interest in supporting the boom in international trade. But conflicting standards may slow worldwide growth over the next few years.

BY CHERYL D. SNAPP

Global commerce is nothing new. But as trade sanctions are lifted and joint international ventures become commonplace, trade is becoming increasingly fast paced and intense. As global competition swells, companies are turning to technologies such as electronic data interchange (EDI), which facilitates computer-to-computer communication of standardized electronic transactions between sites.

Liz Claiborne Inc., one of the nation's leading clothes manufacturers, uses international EDI to coordinate activities between U.S. corporate offices in New York City, its headquarters in New Jersey and the company's six Far East operating sites. Likewise, Ford Motor Co., based in Dearborn, Mich., uses EDI to correlate inventory requests with suppliers in Europe.

The wisdom of EDI is obvious. Transactions that have traditionally involved mailing or faxing paper documents—order forms, invoices and fund transfers—can be handled more efficiently through company-owned or public electronic data network services.

"We consider EDI an absolute necessity," says Tom Bass, manager of production, planning and control for Ford. "Just by eliminating the mail time alone, we're able to dramatically improve our rate of inventory return."

When dealerships order cars, Ford breaks down the transactions into thousands of purchasing requests matched against blanket purchase orders for each of the suppliers involved. Before EDI, these requests were delivered to the suppliers by mail. Today they are transferred in electronic format to the suppliers' computers. The order process that used to require at least a week is now completed within a matter of hours.

EDI also improves accuracy. According to Bass, "in an EDI system, the data is input once, by the person who knows best what the information is, rather than reentered as it proceeds through the system." In the case of Ford, employees enter information into the EDI system immediately as orders for cars are received. The information moves directly into the suppliers' computers as requests for parts, and Ford eliminates the possibility that order entry clerks at major vendors will misplace or misread the request.

Most existing EDI systems have been implemented by in-house groups for companies in the automotive, retailing, chemical and electronics industries. Challenges arise when those companies seek to extend their EDI programs to encompass transactions with trading partners on a broad national or international scale.

A November 1988 report by Datapro Research of Delran, N.J., notes a trend among companies such as K mart Corp. and General Motors Corp. These large buyers are issuing requests to their external suppliers to communicate with them via EDI.

"While these requests may or may not take the form of ultimatums," the report states, "the message is still the same—if we process [many] of your orders per month, we'd prefer to deal electronically, and the sooner the better."

As suppliers face the challenge of communicating with multiple organizations, they're increasingly forced to rely upon third-party value-added network (VAN) carriers to provide them with access to EDI. VAN suppliers such as El Segundo, Calif.-based Infonet Computer Sciences Corp., Tymnet and Telenet Communica-



FORD'S BASS: Orders that once took a week to process on paper can now be filled in a matter of hours with EDI.

Photograph by John Hilary

COMMUNICATIONS NETWORKS

tions Corp. of Reston, Va., can take responsibility for providing the data carrier service. They can also reformat data messages to the specific requirements of various groups.

Although forms such as purchase requests generally include the same types of information worldwide, a document format considered standard by U.S. companies may not be recognizable in, perhaps, Switzerland. As a part of their service, local VAN carriers can reconfigure the U.S. purchase request into the format the Swiss suppliers require.

VAN carriers are growing in popularity. New York City-based research firm Link Resources Corp. reports that revenues for domestic VANS increased approximately 10% per year between 1987 and 1990. International VAN carriers, or IVANS, are growing even faster, but total IVAN revenues are much smaller than the U.S. counterpart.

International Challenges

Significantly, neither Datapro nor Link Resources expects global EDI to gain widespread prevalence over the next several years. Considering the high level of current interest in international trade, why is global EDI taking so long to evolve?

Global EDI faces five primary hurdles:

1. Cultural differences. In order to succeed, global EDI must deal with the same challenges that face every aspect of international trade—time differences,

dissimilar customs and business styles, language barriers, tariff structures and incompatible document formats.

2. Legal Implications. Who is responsible if only part of a document is transferred or if the data arrive at the wrong destination? If a document is intercepted by an unauthorized party, who is liable? Such legal implications inhibit national EDI and pose an even greater challenge on an international scale.

3. International Support. To succeed, global EDI must ensure qualified training and support mechanisms at every networked locale.

□ U.S. AND EUROPEAN STANDARDS FOR THE AUTO INDUSTRY ARE INCOMPATIBLE.

4. Conflicting Standards. Unfortunately, EDI has evolved differently among various industries and even among the same industries in different regions. "EDI suppliers are forced to deal with unlike implementations among industries and in different parts of the world," says Laura Andrus, director of marketing for Infonet. "For example, there are U.S. and European standards for the automotive industry, and the two are completely incompatible."

Current de facto EDI standards include the American National Standards Insti-

tute (ANSI) X.12, which prevails in Canada and the United States, and EDIFACT (EDI for Administration, Commerce and Transport), which appears to be emerging as the international standard.

5. Complexities of Distance. When suppliers are scattered throughout the world, it's difficult for the various parties to negotiate and reach agreement on consistent EDI network implementations. For example, even if the parties agree that the third line of the purchase request is reserved for the supplier's address, they can run into trouble if the U.S. document allows the entry of 15 characters on line three, but the Swiss format accepts only nine characters.

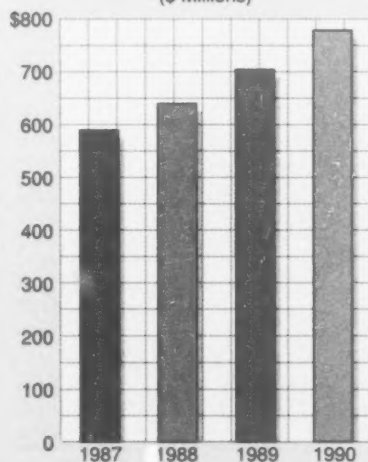
EDI vendors are working to address global concerns. In most cases, EDI suppliers offer worldwide service by establishing remarketing relationships with regional VANS. In this way, a supplier such as Infonet can carry a message from a U.S. company to the border of Singapore for remarketing by a local VAN. According to David Taylor, vice president at Gartner Group Inc. of Stamford, Conn., this is the type of global solution that GE Information Services of Rockville, Md., and IBM currently supply.

The multiple carrier approach to international EDI takes advantage of local vendors' abilities to deal with their own regional translations, tariffs, regulations and cultural norms. The negative aspect, however, is that the IVAN carrier loses

Who's Driving the VAN Market

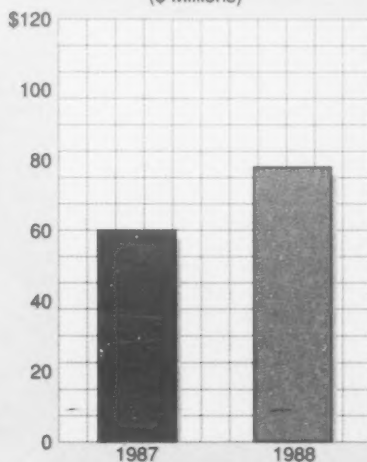
Revenues of U.S. value-added network vendors far surpass those in the international VAN market...

U.S. VAN REVENUE, 1988
(\$ Millions)



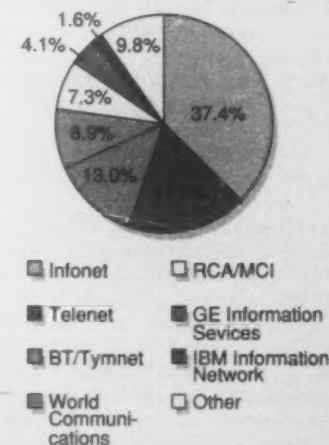
but the faster rate of worldwide growth suggests an increased interest overseas in EDI.

INTERNATIONAL VAN REVENUE, 1988
(\$ Millions)



Infonet's lead in international market share has been strengthened with overseas equity partners.

THE INTERNATIONAL VAN DATA
TRANSPORT MARKET



Source: Link Resources Corp.

COMMUNICATIONS NETWORKS

control of the EDI data as the messages are handed off, and it becomes more difficult to ensure uniform service and support.

A Class by Itself

According to the Datapro report, IBM's Information Network falls into a class by itself, in some respects. Because of Big Blue's large base of installed systems, it is relatively easy to send EDI documents from one IBM site to another. IBM's preferred EDI standard is, not surprisingly, the company's own Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC) protocol environment. According to the report, "IBM's primary advantage is its marketing clout . . . buyers seeking to persuade suppliers to go EDI can count on IBM to go to bat for them and use its polished 'marketing skills' to get them on line."

Although the SNA protocol remains an atypical global EDI network approach, to IBM's credit there are an estimated 30,000 SNA networks already in place. But the SNA standard is primarily useful only for intracompany transmissions. As IBM shops automate communications with their suppliers, they face the same EDI challenges as everyone else. Unless their suppliers are also standardized on SNA, some type of EDI conversion is still required.

In December 1988, Infonet announced a new approach to global EDI:

□ REMOVAL OF TRADE BARRIERS IN EUROPE WILL LIKELY CAUSE AN EXPLOSION IN EDI.

the company formed operating alliances with a number of the national Post, Telephone and Telegraph agencies in other countries. Under the agreements, the PTTs own portions of Infonet stock. Ten PTT partners currently control 70% of Infonet stock; U.S.-based Computer Sciences owns the remaining 30%. The program, called Global Trading Partner Management, is designed to ensure that trading partners have a vested interest in advancing Infonet's global EDI.

Global Software

Infonet provides EDI software developed by Supply Tech Inc. of Southfield, Mich., on an original equipment manufacturer (OEM) basis to all of the global EDI participants. This software provides end users with transparent EDI translation services within the framework of a

consistent user interface.

"We're just now starting to implement global EDI," says Ted Annis, president of Supply Tech. "This is coming about as a result of our U.S. clients needing to establish EDI relationships with suppliers in Europe and the Asian Basin. Although international EDI implementations are now in the beginning stages compared with those being established in the United States, Annis expects them to gain in strength."

The Gartner Group's Taylor views the Infonet approach to global EDI as a positive trend. "The advantage to Infonet is that they wind up being a low-cost, long-haul service provider for data services," he says.

The potentially negative aspect Taylor foresees is that the majority of the PTTs are government-operated and/or government-regulated utilities. "The PTTs' ability to be aggressive marketers of EDI is rather limited," Taylor says. "Infonet's challenge lies in getting the PTTs to be effective agents for EDI in each of those countries."

Says Mark Winther, vice president of electronic communication services for Link Resources, "I think Infonet's strategy to be a multinational EDI gateway is sound." But he also cautions that "their success will depend heavily on the types of partners they've got. They're still just beginning to build these relationships."

EDI growth in Europe may be spurred by U.S.-based multinational corporations extending their EDI networks overseas. Supply Tech's Annis reports that among nonautomotive manufacturing firms, Peoria, Ill.-based Caterpillar Inc. is currently the largest EDI site in the

In Search of Standards

One of the greatest challenges facing proponents of global EDI is the presence of multiple EDI standards. Unfortunately, EDI standards have evolved both by industry and by region, which makes the implementation of a global EDI framework extremely complex.

One of the first EDI standards to emerge was from the Transportation Data Coordinating Committee (TDCC), now called the Electronic Data Interchange-Association (EDI-A). The TDCC standard was designed specifically for the transportation industry, although it has served as the platform for development in other areas. The grocery industry, for example, initiated the Uniform Communication Standard (UCS) about eight years ago as an offshoot of TDCC.

As EDI matures, proponents recognize the need for EDI standards to accommodate multiple industries. The most prominent EDI standard in Canada and the United States is currently ANSI X.12, from the American National Standards Institute's X.12 subcommittee. This standard employs much of the same architecture as TDCC, but is better equipped to traverse industry-specific boundaries.

In Europe, the reigning standard is the United Nations-sponsored EDIFACT, from the EDI for Administration, Commerce and Transport (EDIFACT) committee. Although the EDIFACT standard is less mature than ANSI X.12, (EDIFACT has formally approved only one transaction set; ANSI X.12 has 30), EDIFACT's strength as a de facto standard is too great to ignore.

Although EDI proponents acknowledge that ANSI X.12 and EDIFACT are the leading standards, it is unlikely that the two will converge. For the near future, global EDI solutions will continue to require multistandard support.

world. Caterpillar uses the ANSI X.12 EDI standard to exchange a total of five types of electronic documents with an estimated 800 suppliers worldwide. "Up until three months ago, we weren't even allowed to talk about Caterpillar's EDI program, because the company regarded it as a strategic competitive weapon," says Annis.

Supporting a Standard

The Dow Chemical Co. also uses the ANSI X.12 standard. Senior project manager Keith Mead says the Midland, Mich.-based company uses the standard to handle transactions with customers and suppliers throughout North America. As Infonet's EDI program adds support for the EDIFACT standard, Dow Chemical's intent is to extend its EDI program to encompass company transactions worldwide.

Ford, which also uses EDI extensively on a national basis, is now in the beginning stages of establishing its EDI program worldwide, says production manager Bass. "Internationally, EDI's at about the same point as it was over here [in the U.S.] a couple of years ago," says Bass. "They're not as convinced in Europe, for example, that EDI is all that wonderful, and that it's the way to go. It's taking some selling."

Still, there's no hesitation in the current advice to clients from Winther of Link Resources: "It's time to pick an EDI standard and just do it. The benefits are clear." □

Cheryl Snapp is a freelance writer specializing in communications for Orem, Utah-based Snapp & Associates Inc.